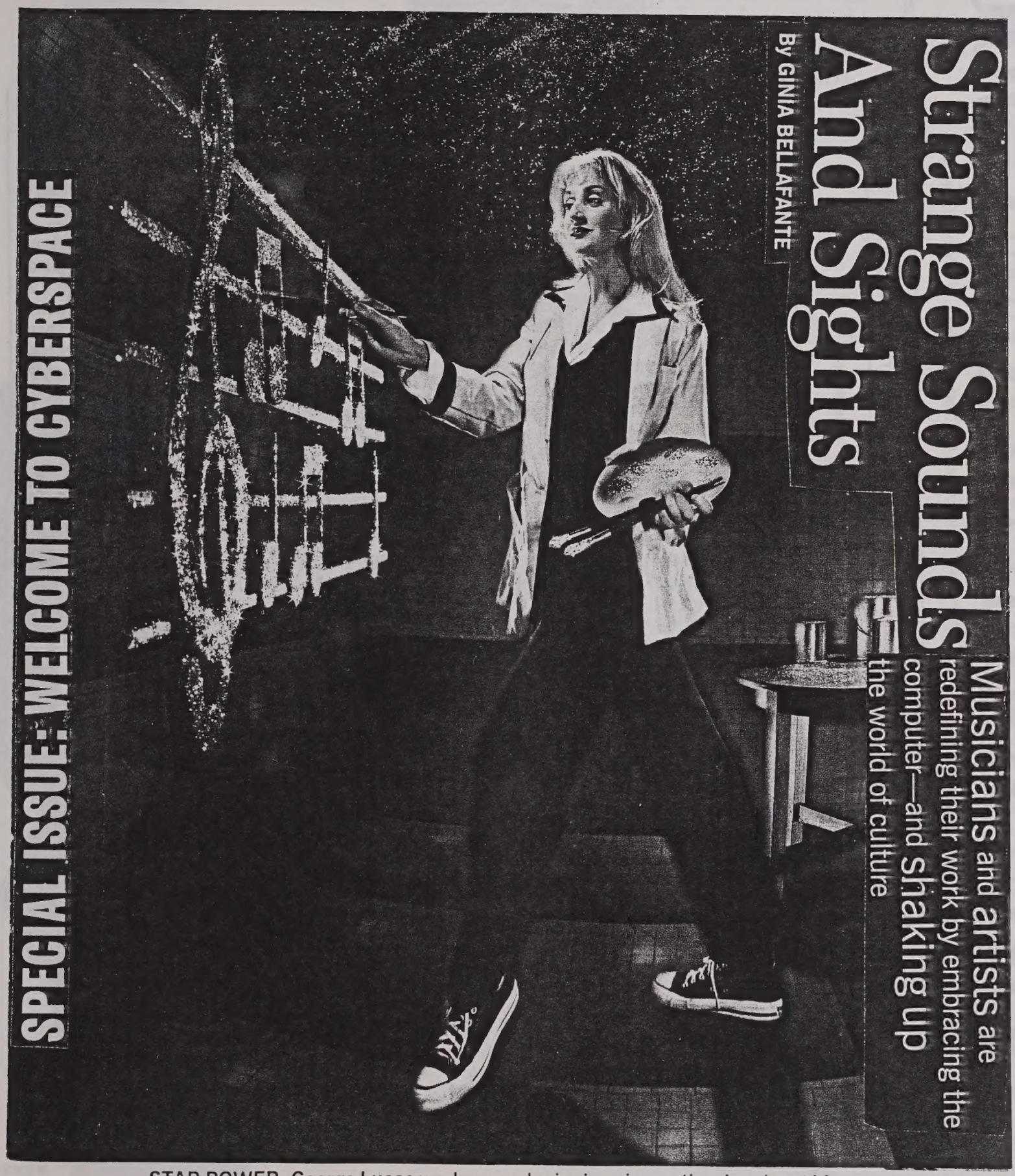
TIME

SPECIAL ISSUE, SPRING 1995

95.6
Introduced herself to Digital World.

Another practitioner on the rise is Italian astrophysicist Fiorella Terenzi, 30, who has been described as a cross between Madonna and Carl Sagan. Terenzi has used radio telescopes to intercept radio waves from a galaxy 180 million light-years away, then fed them into a computer, applied a sound-synthesis program to convert her data into music and produced *Music from the Galaxies*. Result: part New Age, part *Buck Rogers* sound track, played on an oscilloscope.


SPECIAL ISSUE: WELCOME TO CYBERSPACE
By GINIA BELLAFANTE
Strange Sounds And Sights
Musicians and artists are redefining their work by embracing the computer—and shaking up the world of culture

STAR POWER: George Lucas works award-winning cinematic wizardry at his Industrial Light & Magic studio; astrophysicist Fiorella Terenzi, right, composes computerized music with an ear to the heavens

THE WALL STREET JOURNAL.
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FRIDAY, MAY 28, 1993

As featured on the **#11 Billboard Top Music Video "The Gate to the Mind's Eye"**. On **CNN • The Dennis Miller Show • NASA Select TV • Fuji TV • Newsweek On-Air • NPR • Sci-Fi Buzz**. On the cover of **Mondo 2000 • New Frontier • Atari Explorer**. In **Time • Spin • Glamour • LA Style • OMNI**. At **California Academy of Sciences** (special Laserium concert) • **Griffith Observatory • Digital World** • numerous **Multimedia Conventions** • in international satellite TV **performance with Herbie Hancock** • and live and on television and radio in the **United States • Europe** • and **Japan**.

Some May Say Folks Have Touted Music of the Spheres for Centuries

By GREGORY N. RACZ
Staff Reporter of THE WALL STREET JOURNAL

Look at the stars. Can't you hear them?

Now, thanks to Fiorella Terenzi, an astrophysicist and musician, stargazers can peek through a telescope, glance at the Milky Way and listen to the cosmos.

For her dissertation, Dr. Terenzi recorded onto a computer radio-wave transmissions from a galaxy 180 million light-years from Earth. The waves, which were then electronically transferred onto CDs or tapes, emerged as a genre of New Age music.

Comedian Dennis Miller calls her "a cross between Carl Sagan and Madonna."

One critic has described her music as "eerie, moody, science-fictiony stuff." Dr. Terenzi concedes it is often "very low frequency, very dark." But she says that sometimes it can be "very high pitch, very bright." Either way, she says, galactic sound deepens people's enjoyment of space.

Initially, Dr. Terenzi kept acoustic astronomy to herself. But now she has turned performer, and Earth people are tuning in. The Los Angeles-based professor has played to California audiences at a Star Trek convention, the Morrisson Planetarium and the Digital Art Be-In. She has also taken her act on the road, appearing on TV and in concert halls in Europe and Japan.

Now fans don't have to attend her shows to listen to the stars. **Island Records** Inc., whose pop label features U2 among its rock-and-roll artists, released her first compact disk, "Music from the Galaxies." Her next album may be titled "Univer-Sound" or "Galactech."

Dr. Terenzi, who has a doctorate in physics from the University of Milan, specializes in astrophysics and radio astronomy; she has also studied at the *Milano Conservatorio di Musica Verdi*. Her unique background makes her a pioneer in what some musicologists term "acoustic astronomy." Her shows combine unedited sounds of space with high-tech lasers and college-style lectures about turning the constellation Virgo into music.

She is also trying to break into more interactive media. Her pilot CD-ROM project would allow people to watch and hear the cosmos in their homes. She has already provided the soundtrack for a video, and she hopes to break into science-fiction, thriller or horror movies.

But her music, she notes, "would not fit with comedy."

DR. FIORELLA TERENZI
Astrophysicist/Musician
http://www.fiorella.com

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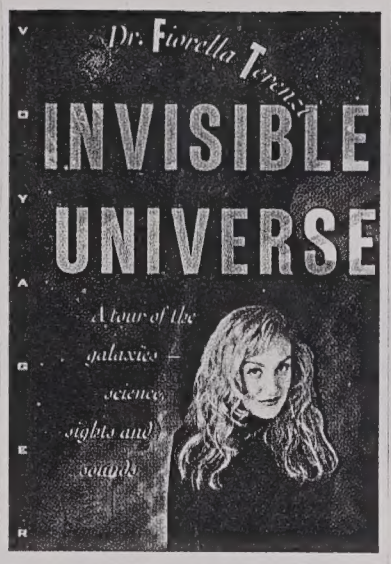


Invisible Universe (The Voyager Company). An amazing CD-ROM adventure thru the universe beyond human sight. Dr. Terenzi explains it all for you as she walks you thru the stars in on-screen videos and Guided Tours, with over 150 breathtaking images from observatories around the world and off of it and 45 minutes of original music by Dr. Terenzi. Explore the universe from the comfort of your home, at school, or watch and listen as the universe flows by in images and music. **Invisible Universe** is a whole new approach to both learning and entertainment.

BLAKE LITTLE

FIORELLA TERENZI

Dr. Fiorella Terenzi has more going for her than just her Madonna-esque mystique. The 28-year-old professor of mathematics and physics at Milan's Liceo Scientifico holds a doctorate in physics from the University of Milan with a specialization in astrophysics and radio astronomy. She studied operatic singing at the Conservatorio di Musica Verdi. And for the last year Dr. Terenzi has successfully "captured" radio waves from UGC6697, a distant galaxy 180 million light-years away.

So what do you do with radio waves once you've got them? Well, Dr. Terenzi has managed, via some fairly brilliant astrophysical maneuverings, to transform these galactical sounds into musical notes, specifically on her first release on Island Records, Music From the Galaxies.

Terenzi, who refers to herself as an "acoustic astronomer," spent a year translating signals from UGC6697 to her computer. Creating actual music was a labor of love: Each second of sound took "eight or nine hours" to produce. According to the doctor, the galaxies are tuned to "about B-flat and D-flat," and they "sing in harmony"—even though that harmony can be a little precarious to translate.

"Sometimes I have to make thousands of combinations of galactic notes," Terenzi explains, "until I find the one that respects the galactic background. Because with all the notes that come out from the galaxy, you can really mess up!"

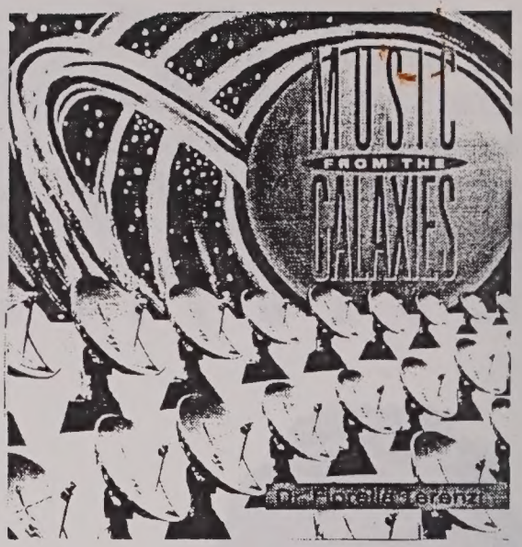
Terenzi's efforts have paid off. *Music From the Galaxies* has thrilled listeners across planet Earth with its strangely sensuous extraterrestrial tonalities. She's become a hot So Cal ticket, lecturing and performing at the Griffith Observatory, Santa Monica City College and that most outer of space stations, Al's Bar.

"The universe calls us every day," says Terenzi. "Although it's not easy to tune in, the voice of the cosmos embraces us like an everlasting cosmic hug."

—Mary Beth Crain

Music from the Galaxies (Island) - Listen to the universe with the sounds of a galaxy 180 million light-years away in space, translated for human hearing during Dr. Terenzi's doctoral research at the University of California, San Diego's Computer Audio Research Laboratory.

The Gate to the Mind's Eye (Miramar/BMG) - #15 on the Billboard Top Music Video Chart, combines the world's best cutting-edge computer graphics videos with a soundtrack by Thomas Dolby and featuring Dr. Terenzi's dreamy "N.E.O." and dancable "Quantum Mechanic".



GLAMOUR

finally, a comic strip about black

be guilty of harassment?

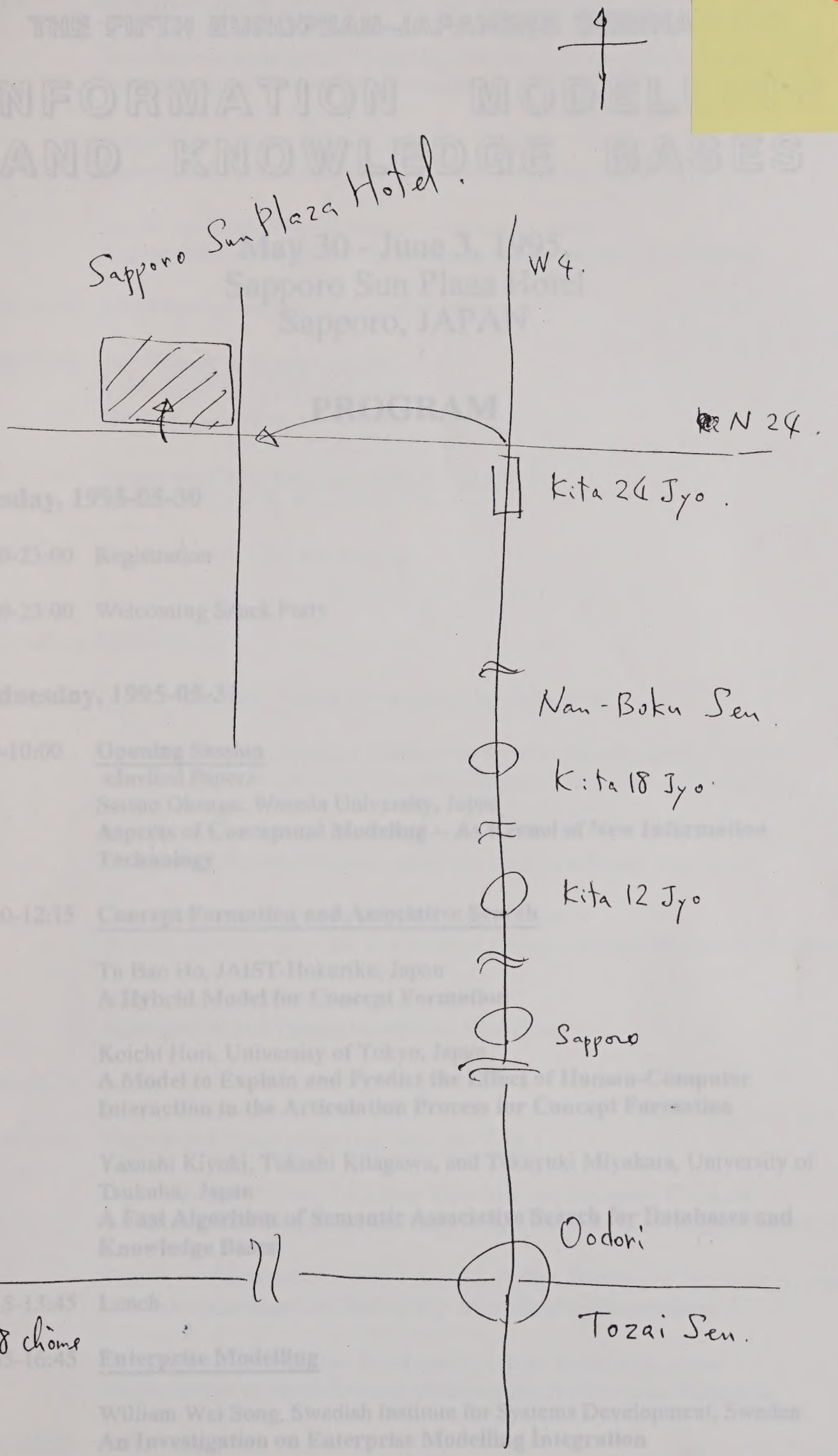
If the universe could sing . .

WHAT'S 180 MILLION LIGHT years away and has a beat you can dance to? A galaxy called UGC 6697—or so says twenty-eight-year-old Italian physicist **Fiorella Terenzi**, Ph.D. Her CD *Music From the Galaxies* (recently released by Island Records) is a musical transcription of UGC 6697's radio waves: forty minutes of hypnotizing bleeps that sound like a cross between New Age relaxation tapes and light rock played underwater.

The first astrophysicist to translate radiation into sound rather than the traditional graphics, Dr. Terenzi says the idea came from her joint training as a musician and scientist at the University of Milan. "I asked myself, 'Why do I have to *draw* radio waves?' " she says. "They can just as easily be thought of as sound, not visuals." She spent a year feeding signals from UGC 6697 into a computer ("It took eight or nine hours to produce each second of sound") but only later started thinking of the results as music. "I noticed some parts are very tonal. If you sit at the piano and play along with the CD, you see that the galaxy is well attuned!"

Unfortunately, UGC 6697 can't appreciate its pop success—it's probably been dead for several million years. In contrast, its agent here on Earth is very much alive. "Next I want to study pulsars," enthuses Dr. Terenzi, a fan of both opera and heavy metal whose blonde finger-in-a-socket hair may do for astrophysics what Flo-Jo's nails did for track and field. "Pulsars give off a beat every second. They're like cosmic drummers!"

DARRYL ESTRINE/ONYX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GLAMOUR

THE FIFTH EUROPEAN-JAPANESE SEMINAR ON

INFORMATION MODELLING AND KNOWLEDGE BASES

May 30 - June 3, 1995,
Sapporo Sun Plaza Hotel
Sapporo, JAPAN

PROGRAM

Tuesday, 1995-05-30

18:00-23:00 Registration

20:00-23:00 Welcoming Snack Party

Wednesday, 1995-05-31

9:00-10:00 **Opening Session**
<Invited Paper>
Setsuo Ohsuga, Waseda University, Japan
Aspects of Conceptual Modeling -- As Kernel of New Information Technology

10:00-12:15 **Concept Formation and Associative Search**

Tu Bao Ho, JAIST-Hokuriku, Japan
A Hybrid Model for Concept Formation

Koichi Hori, University of Tokyo, Japan
A Model to Explain and Predict the Effect of Human-Computer Interaction in the Articulation Process for Concept Formation

Yasushi Kiyoki, Takashi Kitagawa, and Takayuki Miyahara, University of Tsukuba, Japan
A Fast Algorithm of Semantic Associative Search for Databases and Knowledge Bases

12:15-13:45 Lunch

13:45-16:45 **Enterprise Modelling**

William Wei Song, Swedish Institute for Systems Development, Sweden
An Investigation on Enterprise Modelling Integration

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Remigijus Gustas, Janis Bubenko, and Benkt Wangler, Swedish Institute for Systems Development, Sweden
Goal Driven Enterprise Modelling: Bridging Pragmatic and Semantic Descriptions of Information Systems

Juhani Iivari, University of Jyvaskyla, Finland
Conceptual Modelling Based on Behavioral Decomposition

Marite Kirikova, Riga Technical University, Latvia
Explanatory Principles of Aristotle in Requirements Engineering

17:00-18:00 A bus tour to Sapporo Electronics Center(SEC)

18:00-19:00 **Ted Nelson Reception at SEC**
Ted Nelson, Sapporo HyperLab
The talk title will be announced.

19:00-21:00 **Reception Party and Demonstrations at SEC**
Hosted by Sapporo Electronics Center

21:00 The bus leaves SEC for the hotel.

Thursday, 1995-06-01

9:00-12:00 **Meta Models for Model Integration and Selection**

Sari Hakkarainen, Swedish Institute for Systems Development, Sweden
Analysing and Evaluating Heuristic Support for Schema Comparison

Elio Toppano, Universita di Udine, Italy
Automated Model Selection using a Preference-Based Approach

Esko Marjomaa, University of Tampere, Finland
Developing a Framework to Consider Categories and Mutual Relevance

Milan Vlach, JAIST-Hokuriku, Japan
Aggregation and Disaggregation in Modelling

12:00-13:30 Lunch

13:30-15:45 **Theoretical Foundations for DBs and KBs I**

Jorgen Fischer Nilsson, Technical University of Denmark, Denmark
A Visual Query Language for Knowledge Bases with Complex Relations

Noriaki Yoshimura and Naoki Yonezaki, Tokyo Institute of Technology, Japan
Relevant Inference and Reliability dependent on Implication

Hiroshi Nagai and Yahiko Kambayashi, Kyoto University, Japan
Minimization of Horn Clauses Utilizing Binary Decision Diagrams

15:45-16:00 Coffee break

16:00-18:15 **Theoretical Foundations for DBs and KBs II**

Isamu Shioya, SANNO College, Japan
Greibach Normal Form of Context Free Hypergraph Grammars

Shinichi Konomi, Osami Kagawa, and Yahiko Kambayashi, Kyoto University, Japan
Flexible Sharing Mechanisms of Hypermedia Display Using Deputy Objects

Jari Vaario, Nara Women's University, Japan
Self-Organization in Conceptual Modeling

18:15-20:00 Dinner

20:00-22:00 **Panel: Principles and Structures for Modelling**
Chairman : Hannu Kangassalo, University of Tampere, Finland
Panel members will be announced.

Friday, 1995-06-02

9:00-10:30 **Natural Language Semantics for Information Modelling**

Eiji Kawaguchi and Masahiro Wakiyama, Kyushu Institute of Technology, Japan
A Generalization of Semantic Difference Measure in the SD-Form Semantics Model

Johan Hagman and Jan Ljungberg, Gothenburg University, Sweden
Brute Facts vs Institutional Facts of Language as a Foundation for IR

10:30-10:45 Coffee break

10:45-12:15 **Software Modelling**

Koji Soyoda, Yoshimichi Watanabe, and Takehiro Tokuda, Tokyo Institute of Technology, Japan
Two Ideal Models for Software Process Description

Issam A. Hamid, Tohoku University of Art & Design, Japan
Dynamic Modelling of the Behavior of Distributed Systems Specification

12:15-13:45 Lunch

13:45-15:15 **Knowledge Base Applications**

Tadahiro Kitahashi, Osaka University, Japan
Knowledge Representation for a task -- Object Models for Vision and Manipulator & Network Representation for Inference --

Haruki Ueno and Yukio Saito, Tokyo Denki University, Japan
Knowledge-Based Approach for Autonomous Robot with Visual and Tactile Sensors

16:00-18:15 Theoretical Foundations for DBs and KBs II

Izumo Shinya, SANNO College, Japan
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Jun Yamin, Nara Women's University, Japan
Self-Organization in Conceptual Modeling

18:15-20:00 Dinner

20:00-22:00 Panel Principles and Structures for Modelling
Chairman: Izumo Kanagasabi, University of Tampere, Finland
Panel members will be announced.

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Knowledge-Based Approach for Autonomous Robot with Visual and Tactile Sensors

15:15-15:30 Coffee break

15:30-17:00 **Taxonomies**

Jari Palomaki, University of Tampere, Finland
Three Kinds of Containment Relations of Concepts

Jorgen Fischer Nilsson, Technical University of Denmark, Denmark
Object Logic for Conceptual Modelling with a Medical Domain as Case Study

17:00-17:45 **Cognitive Tools**

Marjatta Kangassalo, University of Tampere, Finland
PICCO as a Cognitive Tool

17:45- Free time

Saturday, 1995-06-03

9:00-11:00 **BOF Sessions**
Proposed Session
CODIAK for Conceptual Creativity Studies
by Kari T. Eloranta

11:00-13:00 **Closing Session**

95.8.1

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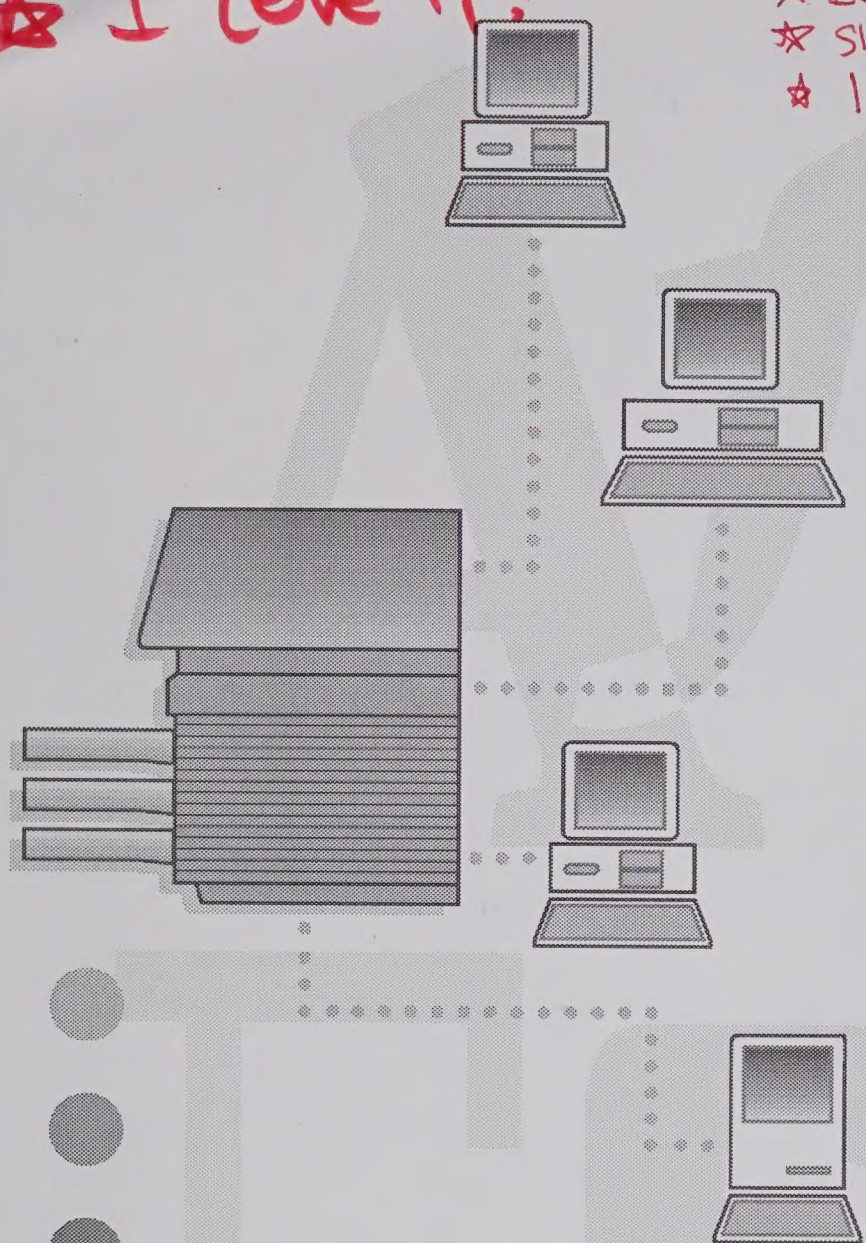

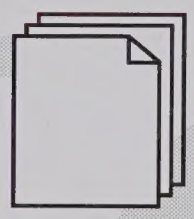

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